



Cambium Networks™

Introduction of cnWave 60 GHz
9/17/2020

- Built on the 802.11ay standard with Mesh support and Terragraph certified
- Enable Gigabit Fixed Wireless Access for high density deployment, up to 15.0 Gbps with channel bonding
- Easy installation with bi-direction auto beam forming
- Easy operation, auto expansion and auto healing with Mesh support
- Support Point-to-Point, Point-to-MultiPoint and Mesh configuration
- Managed by cnMaestro

Distribution Node



V5000

Client Node



V3000

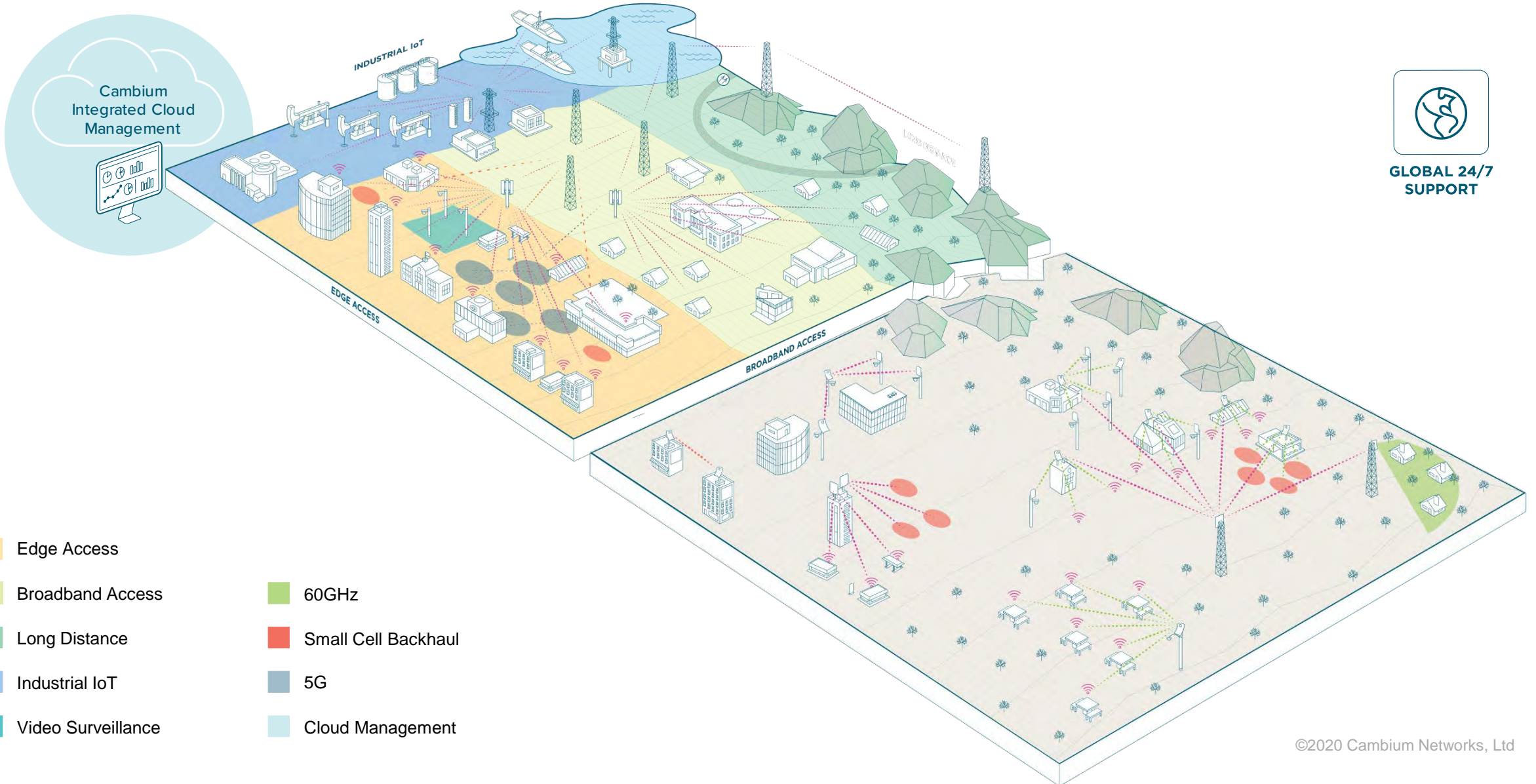


V1000

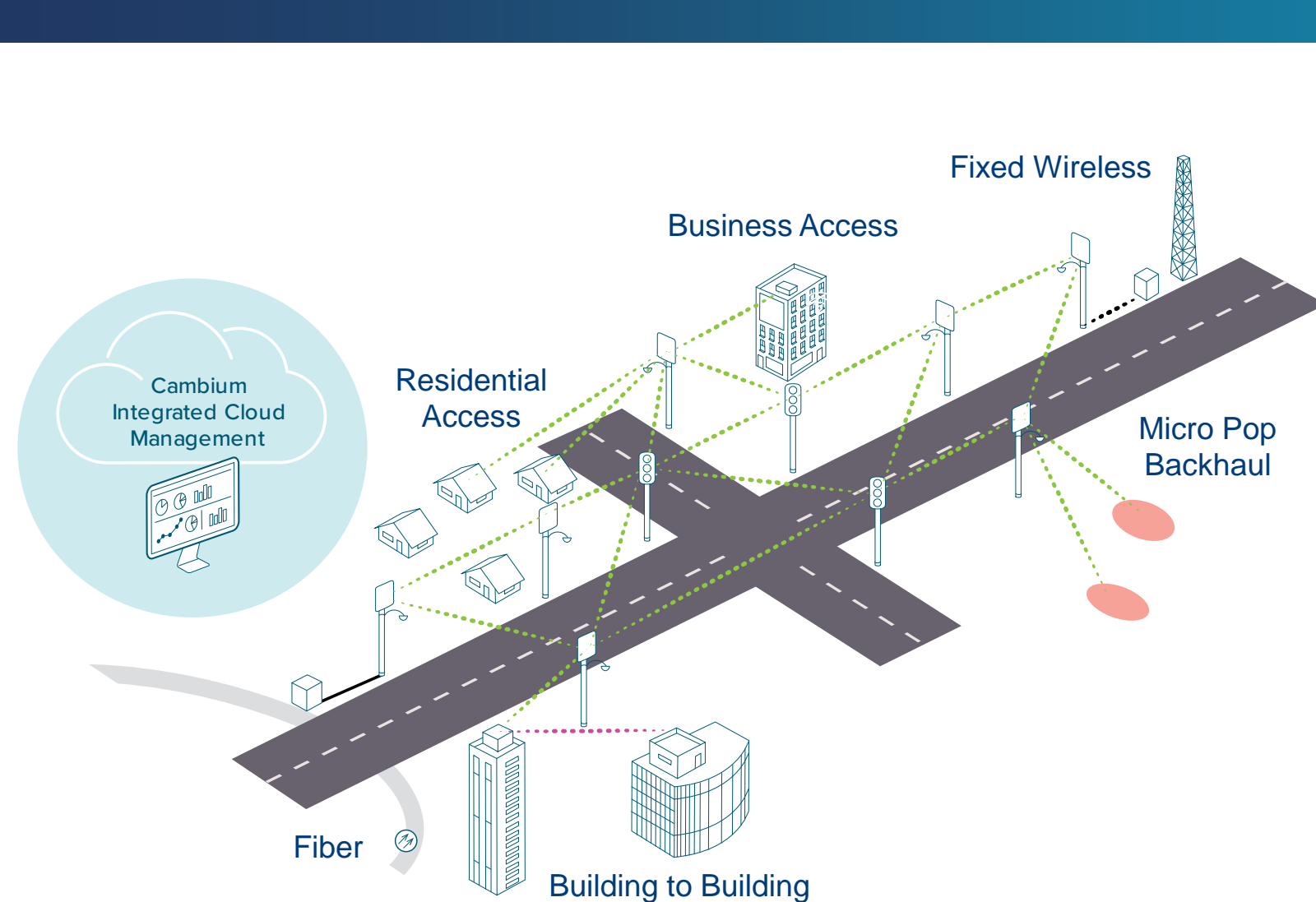
Technical Advantage of 802.11ay vs. 802.11ad

	Description	Benefit
TDMA/TDD	<ul style="list-style-type: none">• High spectrum efficiency even with congestion• Guaranteed throughput with structuralized TDD frame• Lower latency with low jitter	<ul style="list-style-type: none">• Remove access confliction of CSMA defined in 802.11ad, remove overhead of RTS/CTS etc.• Each CN is assigned specific time slots based on request, which it can transmit and receive
Network Synchronization	<ul style="list-style-type: none">• Support high-scale and high-density deployment by minimize in band interference• Support one channel one network	<ul style="list-style-type: none">• Time Synchronization via GPS• All radios are time synchronized, ensure Tx/Rx TDD frame alignment across whole network
Channel Bonding	<ul style="list-style-type: none">• Double the throughput on same distance• Reach longer range on same capacity	<ul style="list-style-type: none">• Support 4.32 GHz channel size by channel bonding two adjacent channel vs. standard 2.16 GHz channel
Mesh Routing	<ul style="list-style-type: none">• Overcome obstruction for longer range• Improve system availability and load balance• Auto heal and auto expansion	<ul style="list-style-type: none">• Distributed network application platform• Determine appropriate routes between mesh nodes

Wireless Fabric from Cambium



- Edge Access
- Broadband Access
- Long Distance
- Industrial IoT
- Video Surveillance
- 60GHz
- Small Cell Backhaul
- 5G
- Cloud Management



- **WTTH – Wireless To The Home**
 - Providing Wireless Broadband access directly to the home.
- **WTTB – Wireless To The Building**
 - Wireless Broadband access provided to rooftops or side of buildings, which then get distributed to individual offices and homes via wire.
- **RTRT – Roof-Top To Roof-Top**
 - Long range Point to Point with high gain dish
 - Multi Dwelling Distribution
- **Fiber Extension**
- **Backhaul for 5G Small Cell, outdoor Wi-Fi, MicroPoP and CCTV**

Service Provider: City center deployment network



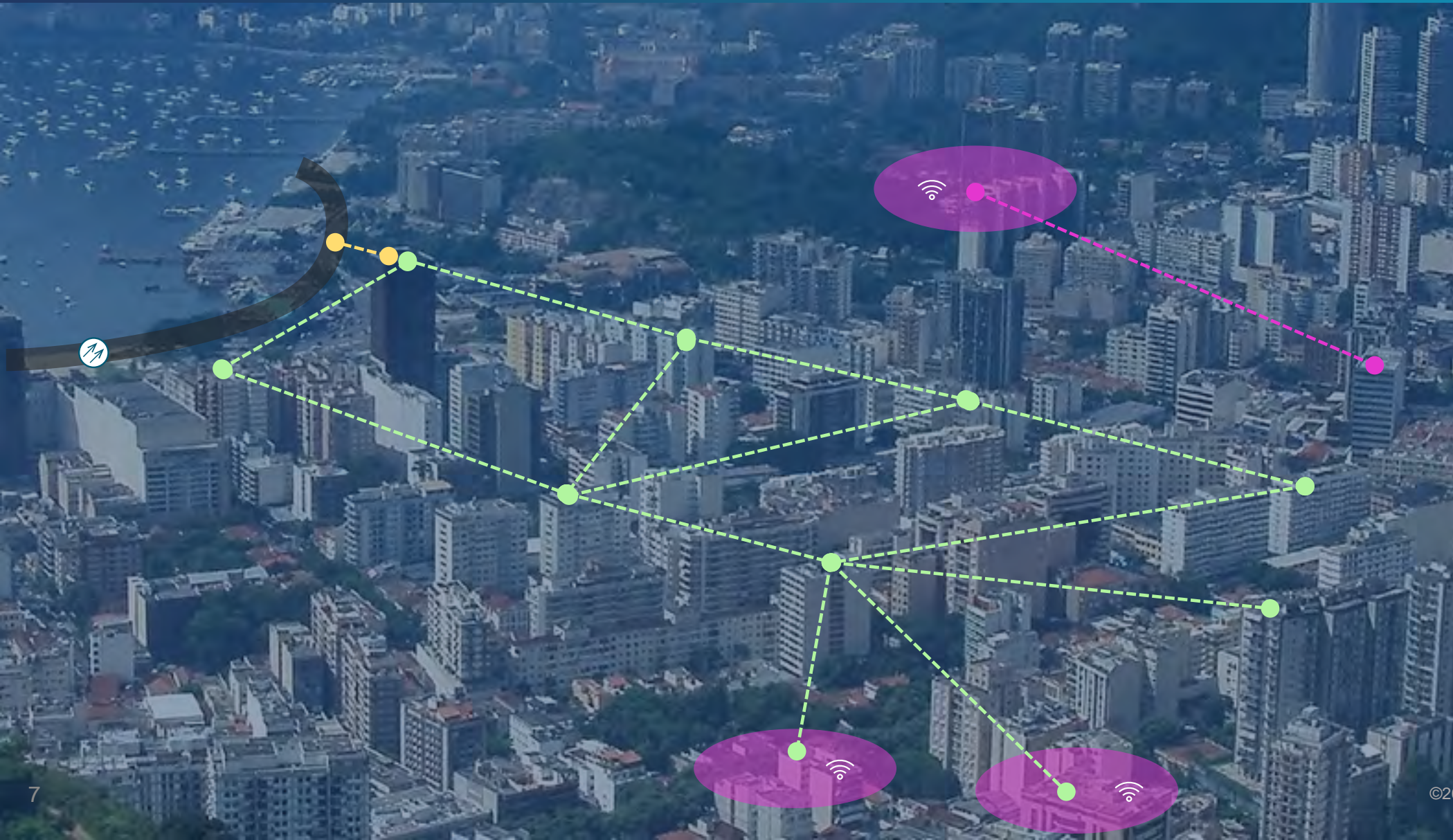
Roof Top to Roof
Top

PMP with Mesh



Wi-Fi

Service Provider: City center deployment network



Building to building

Multipoint

Fixed Wireless
Broadband

Service Provider: 5G Small Cell Backhaul



Point to Point

Point to Multipoint

WISP Suburban deployment



- DN-DN
- DN-CN
- Wi-Fi

Service Provider Suburban Deployment



Roof Top to Roof
Top

DN-CN, PMP with
Mesh


Wi-Fi

Service Provider Suburban Deployment



Building to building

Multipoint

Distribution Node



V5000 - \$1,249

Dual Sector Distribution Node

Client Node



V3000 - \$674

High Gain Client Node



V1000 - \$259

Mid Gain Client Node

Announcement of 60GHz cnWave Solution

- **Accept Pre-Order now**
- **Ship Date:**
 - All cnWave radios will be available for shipment from the Shanghai DC by October 30, 2020.
 - All accessories will be available for shipment from the Venlo/Louisville DC.

Radio	
C600500A004A	60GHz cnWave V5000 Distribution Node
C600500C024A	60GHz cnWave V3000 Client Node Radio Only
C600500D001A	60GHz cnWave V3000 Client Node Antenna Assembly
C600500C001A	60GHz cnWave V1000 Client Node with US cord
C600500C003A	60GHz cnWave V1000 Client Node with EU cord
C600500C004A	60GHz cnWave V1000 Client Node with UK Cord
C600500C008A	60GHz cnWave V1000 Client Node with ANZ Cord
C600500C009A	60GHz cnWave V1000 Client Node with Brazil Cord
C600500C010A	60GHz cnWave V1000 Client Node with Argentina Cord
C600500C011A	60GHz cnWave V1000 Client Node with China Cord
C600500C012A	60GHz cnWave V1000 Client Node with South Africa Cord
C600500C013A	60GHz cnWave V1000 Client Node with India Cord
C600500C014A	60GHz cnWave V1000 Client Node with no Cord

V5000 – Distribution Node

Frequency

- 57 to 66 GHz

Modulation

- BPSK to 16 QAM (MCS 0 to MCS 12) with ACM

Throughput

- 1.9 Gbps Uplink + 1.9 Gbps Downlink per sector
- 3.8 Gbps Uplink + 3.8 Gbps Downlink with channel bonding* per sector

Dual Sector - 280 Degree Coverage with Beam Forming

- +/- 140.0 (Azimuth), +/- 20.0 (Elevation)
- EIRP 38 dBm

PMP/Mesh

- Up to 30 x CNs or 4 x DNs + 26 x CNs

Synchronization: IEEE-1588 TC*

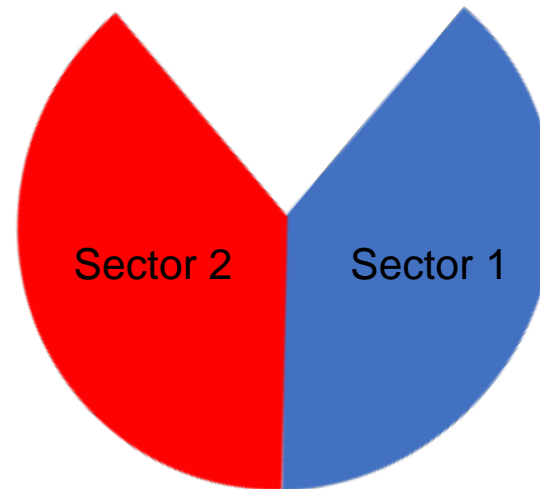
Low Latency: < 1 ms

Data Interface

- 1 x 10 GE + PoE in (Passive)
- 1 x 1 GE + PoE out (802.3at)
- 1 x SFP+

Physical

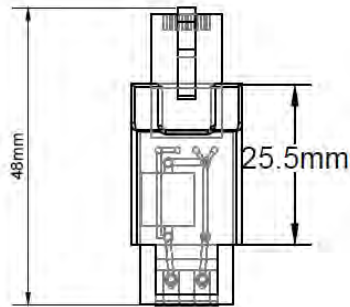
- 280 x 185 x 102 mm (11 x 7.3 x 4 Inches), 2.5 kg (5.5 lbs.) without clamp, -40°C to +60°C (-40°F to +140°F)





- **PSU Port**
 - 10/100/1000/10G BaseT with passive PoE in (57V)
- **AUX Port**
 - 10/100/1000 BaseT with 802.3at PoE out
- **SFP+ Slot**
 - 10G SFP Slot
 - Single Mode
 - Multiple Mode
 - GPON

DC to RJ45 Plug
mini Adaptor



Frequency

- 57 to 66 GHz

Modulation

- BPSK to 16 QAM (MCS 0 to MCS 12) with ACM

Throughput

- 1.9 Gbps Uplink + 1.9 Gbps Downlink
- 3.8 Gbps Uplink + 3.8 Gbps Downlink with channel bonding*

Ultra High Antenna Gain with Beam Forming

- +/- 2.0 (Azimuth), +/- 1.0 (Elevation)
- EIRP 60.5 dBm

Synchronization: IEEE-1588 TC*

Low Latency: < 1 ms

Data Interface

- 1 x 10 GE + PoE in (Passive)
- 1 x 1 GE + PoE out (802.3at)
- 1 x SFP+

Physical

- 346 x 414 x 344 mm (13.6 x 16.3 x 13.5 Inches), 2.5 kg (5.5 lbs.) without clamp
- -40°C to +60°C (-40 to +140°F)





- **PSU Port**
 - 10/100/1000/10G BaseT with Passive PoE in (57V)
- **AUX Port**
 - 10/100/1000 BaseT, with 802.3at PoE out
- **SFP+ Slot**
 - 10G SFP Slot
 - Single Mode
 - Multiple Mode
 - GPON

Frequency

- 57 to 66 GHz

Modulation

- BPSK to 16 QAM (MCS 0 to MCS 12) with ACM

Throughput

- 1 Gbps Uplink + 1 Gbps Downlink

Ultra High Antenna Gain with Beam Forming

- +/- 40.0 (Azimuth), +/- 20.0 (Elevation)
- EIRP 38 dBm

Low Latency: < 1 ms

Data Interface

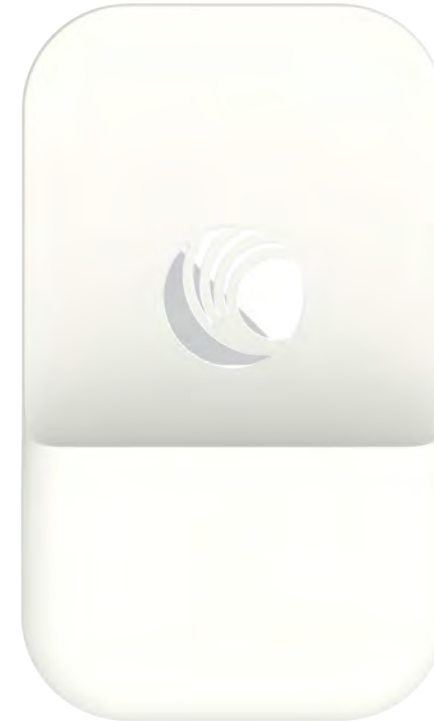
- 1 x 1 GE + PoE in (802.3af)

Power Consumption:

- 10 W

Physical

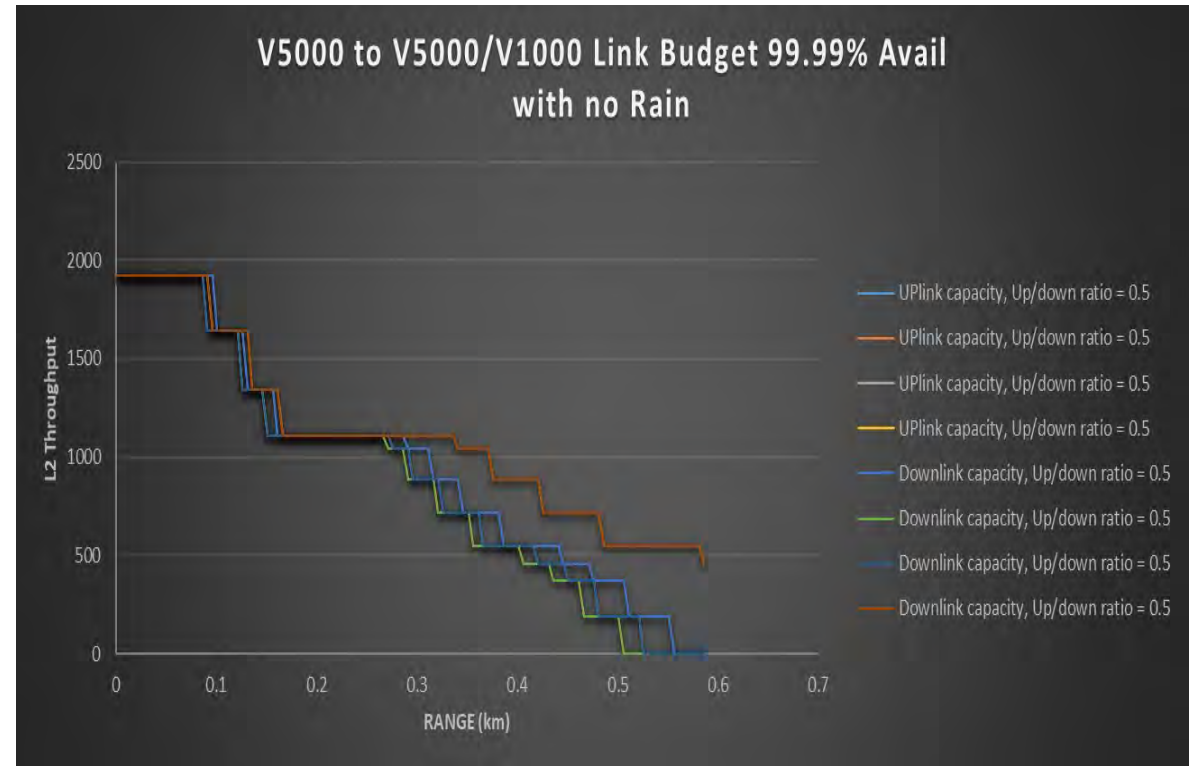
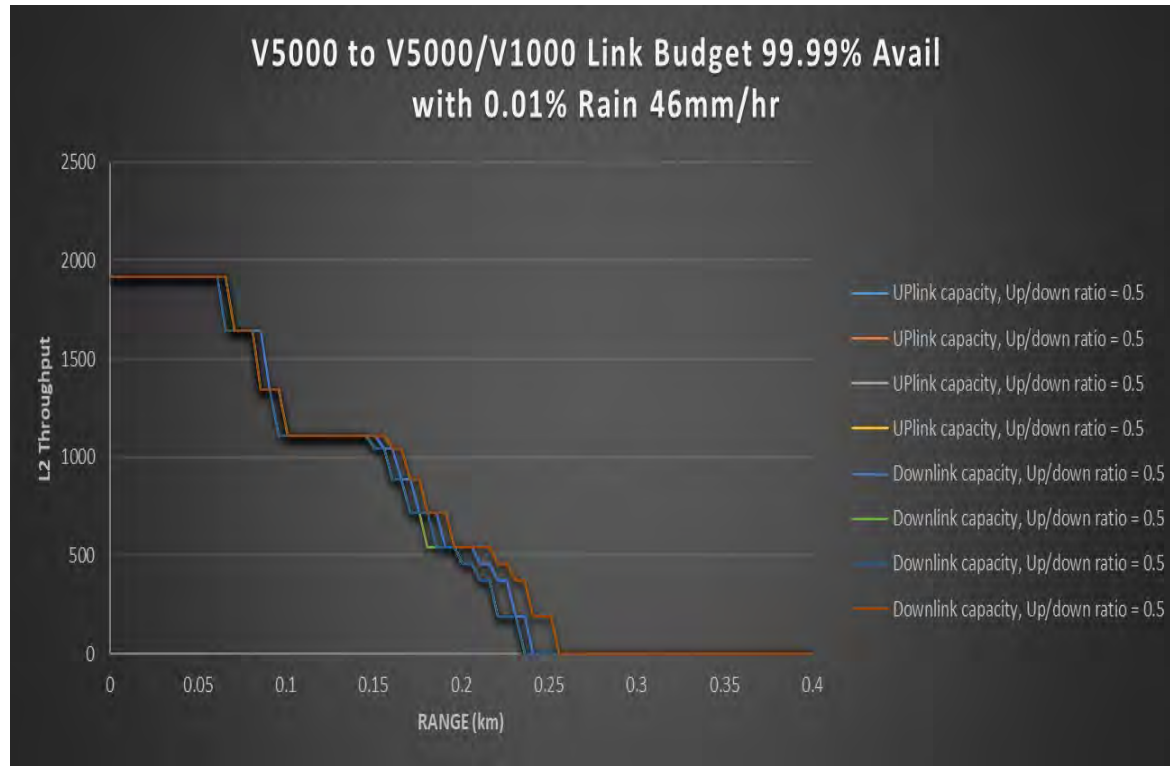
- IP66/67
- 140 x 85 x 40 mm (5.5 x 3.3 x 1.6 Inches), 0.25 kg (0.55 lbs.)
- -40 to +60°C (-40 to +140°F)





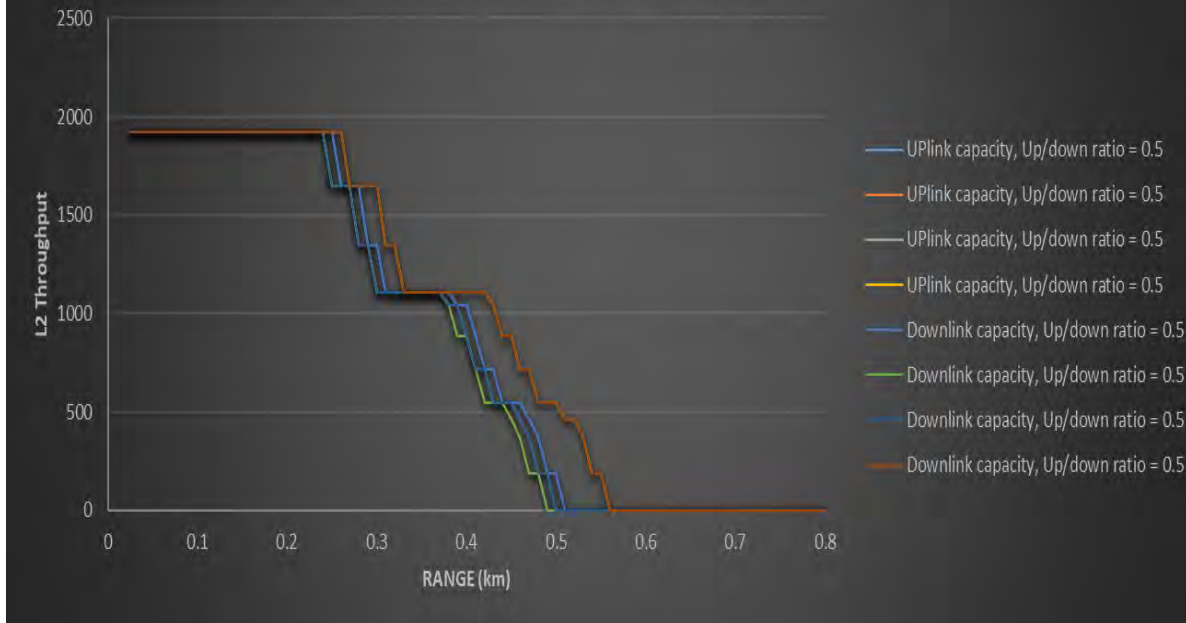
- 10/100/1000 BaseT with 802.3af PoE in

Link budget, V5000 to V5000/V1000, 99.99%

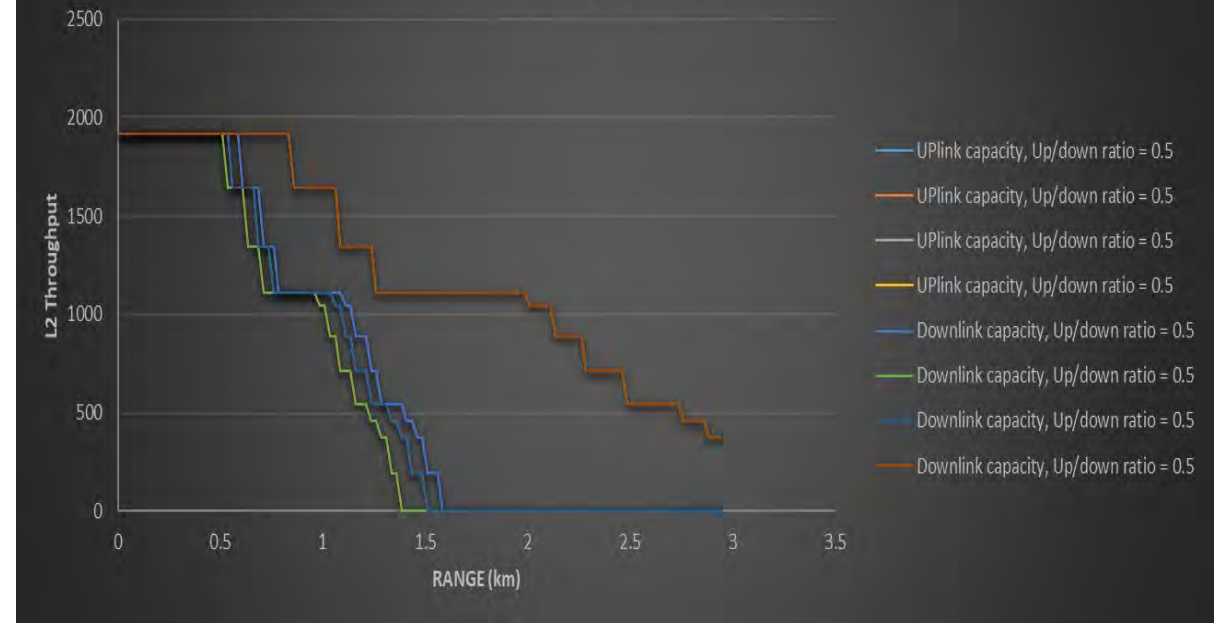


Link budget, V5000 to V3000, 99.99%

V5000 to V3000 Link Budget 99.99% Avail with 0.01% Rain 46mm/hr

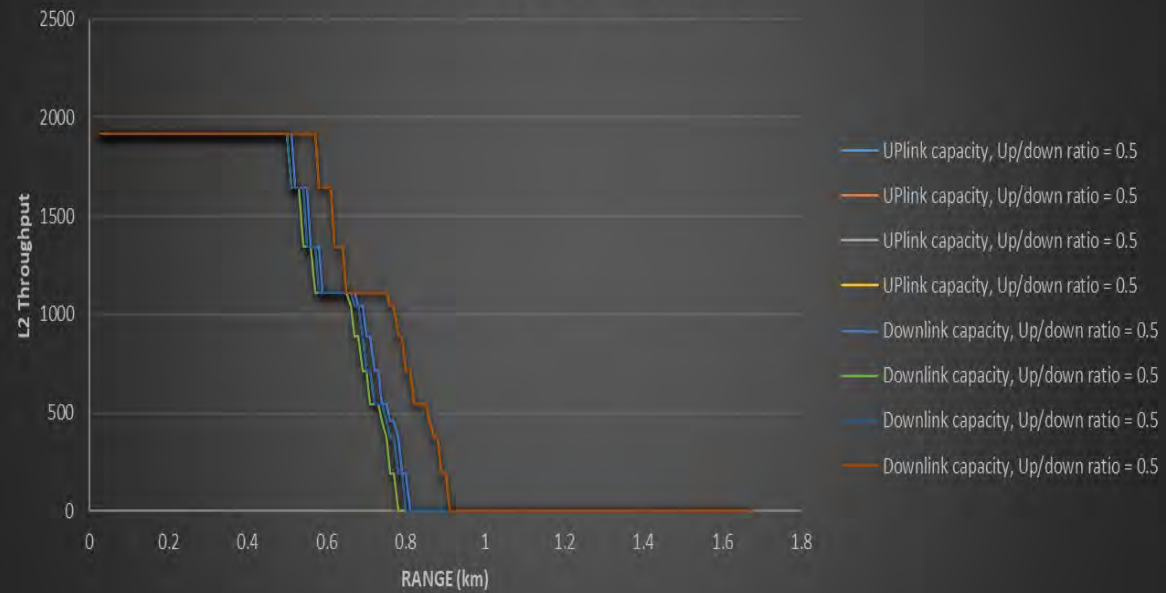


V5000 to V3000 Link Budget 99.99% Avail with no Rain

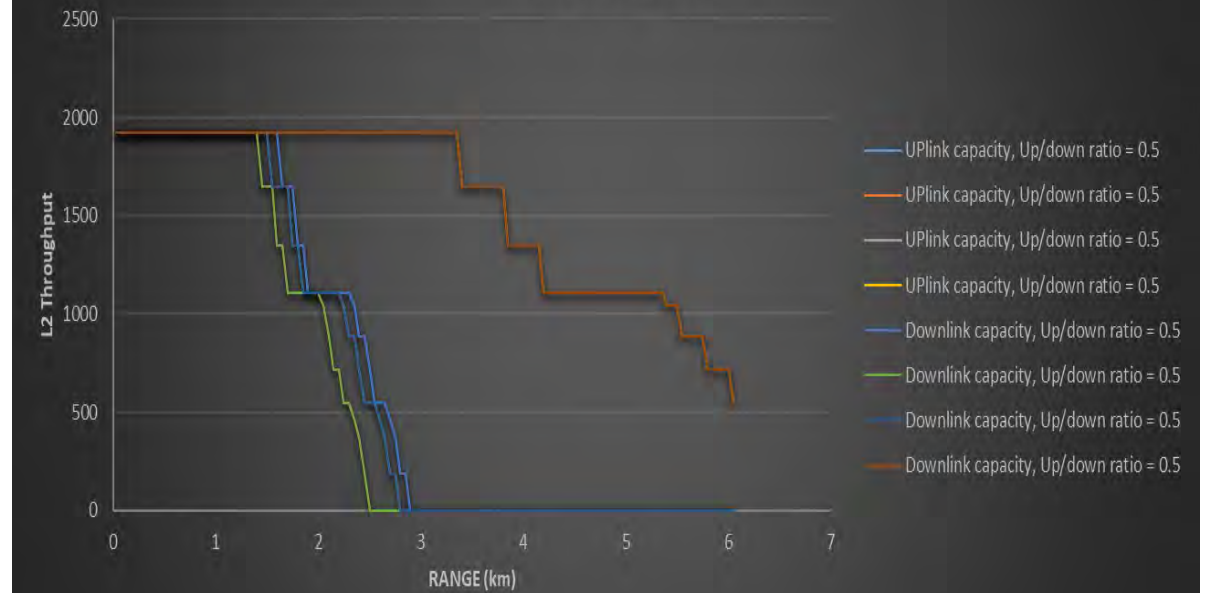


Link budget, V3000 to V3000, 99.99%

V3000 to V3000 Link Budget 99.99% Avail
with 0.01% Rain 46mm/hr



V3000 to V3000 Link Budget 99.99% Avail
with no Rain



- Low Total Cost Ownership (TCO)
 - V5000 280-degree coverage with dual sector
 - No need for site router, simple installation
 - V1000 + V3000 to meet various range challenge
 - Auto Beam forming for easy installation
- Super long range V3000 with beam forming
- Channel Bonding H/W ready, double the capacity with F/W upgrade
- IP 66/67 rated
- High density deployment, each DN can support up to 30 CNs or 26 CNs + 4 DNs
- cnMaestro – one panel for NMS
- Easy planning (Advanced Network Planning + LINKPlanner)



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